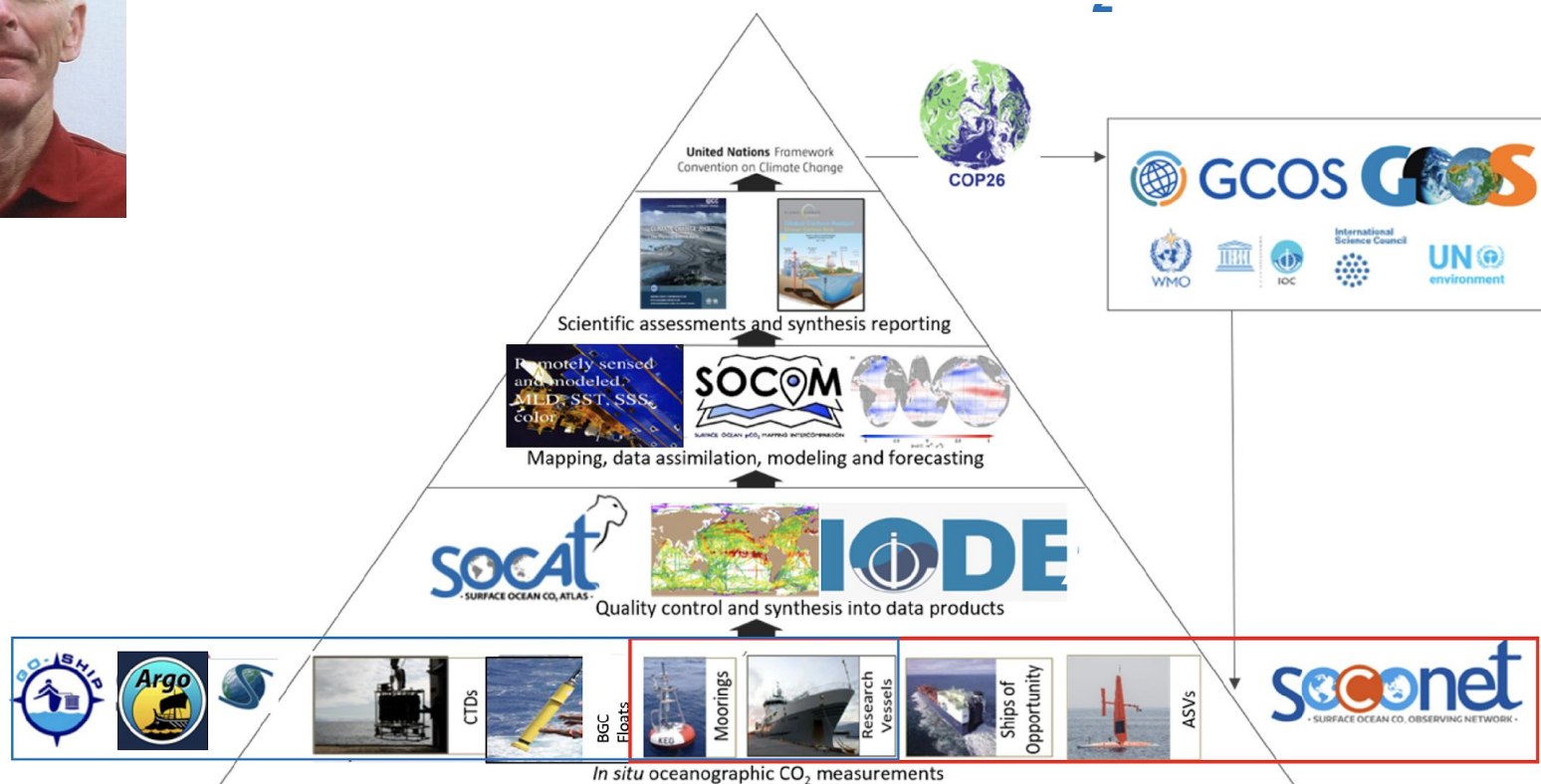


# A Global Surface Ocean Carbon Dioxide (CO<sub>2</sub>) Network to quantify ocean CO<sub>2</sub> uptake on seasonal timescales in near real-time



Rik Wanninkhof, Senior Scientist NOAA/AOML



## The Value Chain of Surface Ocean CO<sub>2</sub> Measurements

(Modified from Bakker; and Guidi et al. (2020) Big Data in Marine Science. EMB Future Science Brief 6, 10.5281/zenodo.3755793)

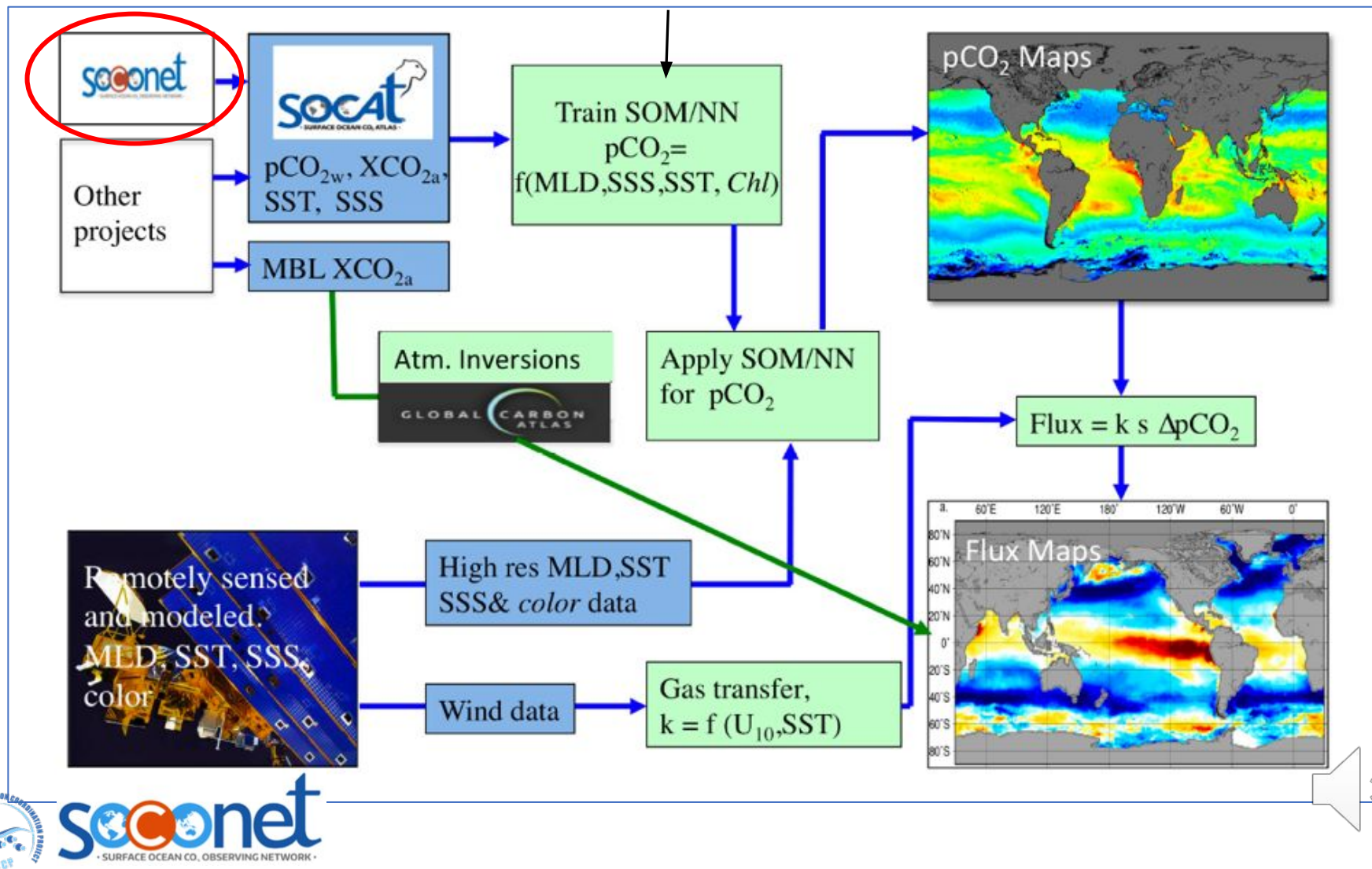


Rick Spinrad, NOAA Administrator  
*Session: the future of climate modeling*  
(COP26 November, 2021)



# Surface Water CO<sub>2</sub> Observing System

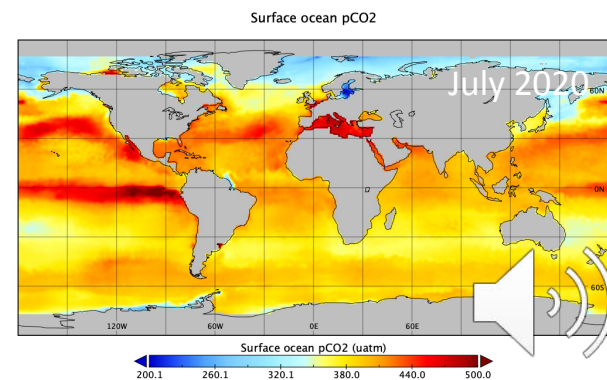
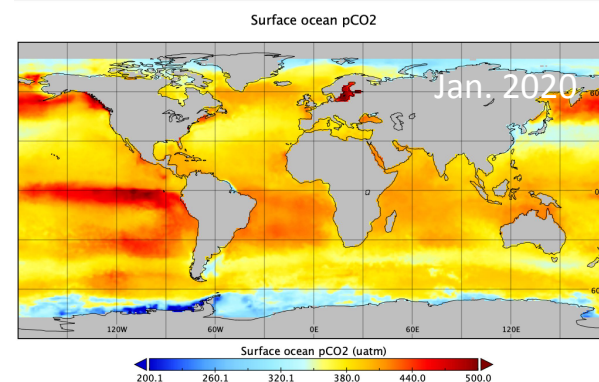
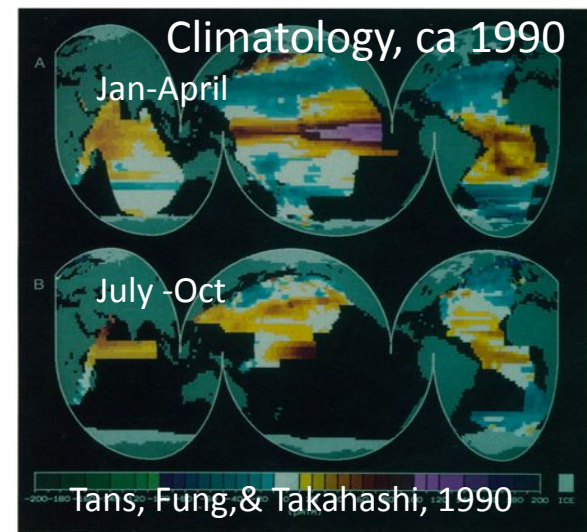
The SOCONET Network as part of the CO<sub>2</sub> observing system





# Improved products over time

- ❑ NOAA has sponsored underway CO<sub>2</sub> measurements from research ships for over 30 years
- ❑ GOMO provides sustained funding for SOOP, Moorings, (and ASVs) (≈ \$2 M/yr)
- ❑ Coordinated data ingestion, QC and distribution through SOCAT
- ❑ Contributes to the UN SDG 14.3 (reduce OA)
- ❑ Data is used to create monthly flux maps with machine learning techniques
- ❑ Used in global and regional assessments (IPCC, RECCAP)



But.....

...

# Discrepancies with models and data-based products require better data

- Need an operational system to assure continuity, high quality
- Areas requiring further research: Decadal variability and Magnitude of sink
- Urgency- decisions on climate mitigation, marine carbon dioxide removal, ocean health and emission reduction require a trustworthy observation based air-sea CO<sub>2</sub> flux product

## A Surface Ocean CO<sub>2</sub> Reference Network, SOCONET and Associated Marine Boundary Layer CO<sub>2</sub> Measurements

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